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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/334,049	06/15/1999	ARIEL BEN-PORATH	3656/PDC	4880

7590 05/24/2002

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EXAMINER

BALI, VIKKRAM

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 05/24/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/334,049	Applicant(s) BEN-PORATH, ARIEL	
	Examiner Vikram Bali	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 3-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Mizuno (US 6047083).

With respect to claim 1, Mizuno discloses:

Imaging the surface to form a defect image, (see col. 4, lines 6-8, wherein the image of the wafer is formed using the SEM);

Classifying the defect as being in one of a predetermined number of core classes of defects using a core classifier, (see col. 3, lines 39-41); and

Classifying the defect as being in one of an arbitrary number of variant subclasses using a specific adaptive classifier associated with the one core class, (see col. 3, lines 42-44).

With respect to claim 3, Mizuno further discloses:

core classes of defects comprise a pattern defect and a particle defect, (see figure 7, cavity and isolation defect).

With respect to claim 4, Mizuno further discloses:

core classes of defects comprise a missing pattern in the surface, an extra pattern on the surface, a particle on the surface, a particle embedded in the surface, and micro scratches on the surface, (see col. 3, lines 39-41).

With respect to claim 5, Mizuno further discloses:

variant subclasses of defects comprise a particle of a predetermined size on the surface or embedded in the surface, (see figure 7, the defects are further classify by the size of the defects into the subclasses also see col. 3, lines 42-44).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno (US 6047083) in view of Automatic defect classification for semiconductor manufacturing, by Paul et al, Machine Vision and Application, 1997, pp 201-213.

With respect to claim 2, Mizuno discloses the invention substantially as disclosed and as described in claim 1 rejection above. However, he fails to disclose: classifying the defect as being in one of an arbitrary number of variant classes using a full classifier when the core classifier cannot classify the defect into one of the core classes, as claimed in claim 2. Paul teaches: classifying the defect as being in one of an arbitrary number of variant classes using a full classifier when the core classifier cannot classify the defect into one of the core classes, (see page 202, second column first 5 lines, wherein it states that if the a classifier can not classify the defects then the defects are left for the operator to classify); as claimed.

The two references are combinable as they are solving the similar problem of classifying the defects.

One ordinary skilled in the art at the time of invention will be motivated to do this because the two classifying system will compliment each other (see page 202, second column, lines 5-6, of Paul).

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno (US 6047083) in view of Applicants prior admitted art.

With respect to claim 6, Mizuno discloses the invention substantially as disclosed and as described in claim 1 rejection above. However, he fails to disclose: providing a plurality of specific adaptive classifiers, each being associated with less than the predetermined number of core classes; as claimed. But, as applicant admits that the plurality of specific adaptive classifiers, each being associated with less than the predetermined number of core classes, see page 11, lines 7-30.

Therefore, it would have been obvious to one ordinary skilled in the art to combine the features as claimed in to the system of Mizuno system of classifying the defects as the features are well known. And, this combination provides an apparatus work faster and more accurate.

6. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno (US 6047083) in view of Nakamura et al (US 5172421).

With respect to claim 7, Mizuno discloses the invention substantially as disclosed and as described in claim 1 rejection above. However, he fails to disclose: performing a boundary analysis of the defect image, a topographical analysis of the defect image, or both to classify the defect into the one core class; as claimed in claim 7. Nakamura teaches: performing a boundary analysis of the defect image, (see Abstract, lines 12-16, wherein the boundary analysis is done to classify the defects) as claimed.

The two references are combinable as they are solving the similar problem of classifying the defects.

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One ordinary skilled in the art at the time of invention will be motivated to do this because the boundary analysis of the defects in order to classify the defects provides an apparatus that makes the task performed more rapidly and with less expense and with a high degree of accuracy.

With respect to claims 8 and 9, Mizuno and Nakamura disclose the invention substantially as disclosed and as described in claim 7 rejection above. However, they fail to disclose: training the specificvariant subclasses; and analyzing predicatesvariant subclasses; as claimed in claim 8 and 9. The features of claim 8 and 9 are well known in the art as explained in the applicant's specification see page 12, lines 7-13.

Therefore, it would have been obvious to one ordinary skilled in the art to combine the features as claimed in to the system of Mizuno and Nakamura of classifying the defects as the features are well known and the motivation comes from the well known functionality as it is a learning technique that is well known in the art to make the apparatus work faster and more accurate.

Claims 10-18 and 22-30 are rejected as claims 1-9 as claims 10-18 and 22-30 are claiming similar subject matter as claimed in claims 1-9.

Claims 19, 20 and 21 are rejected as claims 1, 8 and 9 as claims 19, 20 and 21 are claiming similar subject matter as claimed in claims 1, 8 and 9.

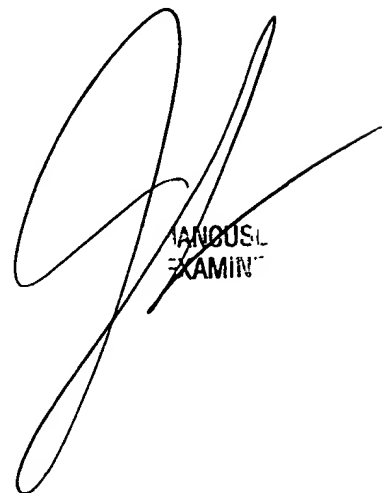
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vikkram Bali whose telephone number is 703.305.4510. The examiner can normally be reached on 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703.308.6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9314 for regular communications and 703.872.9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.306.0377.

Vikkram Bali
Examiner
Art Unit 2623

vb
May 13, 2002



Handwritten signature of Vikkram Bali, with a stamp that reads "VANDUSL EXAMIN" partially visible.